

1. A Revision of the Fishes of the South-American Cichlid Genera *Crenacara*, *Batrachops*, and *Crenicichla*. By C. TATE REGAN, B.A., F.Z.S.

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(Plates XIV. & XV.\*)

The genera dealt with in the following revision are distinguished from all other Cichlidæ by the denticulated posterior margin of the præoperculum. I have given a list of the specimens in the British Museum Collection on which my descriptions are based, with the total length in millimetres of each.

CRENACARA.

*Crenicara* Steind. Sitzb. Ak. Wien, lxxi. 1875, p. 99; Eigenm. & Bray, Ann. Ac. N. York, vii. 1894, p. 619; Pellegr. Mém. Soc. Zool. France, xvi. 1903, p. 169 (1904).

*Dicrossus* Steind. t. c. p. 102; Eigenm. & Bray, t. c. p. 620; Pellegr. t. c. p. 170.

Body ovate or elongate, more or less compressed; scales large, ctenoid. Two lateral lines; scales of the lateral line of the same size as those above and below it. Mouth small; jaws equal anteriorly; maxillary not exposed; a band of small conical teeth in each jaw; upper surface of head scaly to between the orbits; cheeks and opercular bones scaly; posterior border of præoperculum finely denticulated. Gill-rakers short, few. A single dorsal with XIV–XVII 8–9 rays. Anal with III 7–8 rays. Pectoral asymmetrical, with 15 rays; ventrals a little behind the bases of the pectorals. Caudal rounded.

Two species from the Amazon and Guiana.

1. CRENACARA PUNCTULATA.

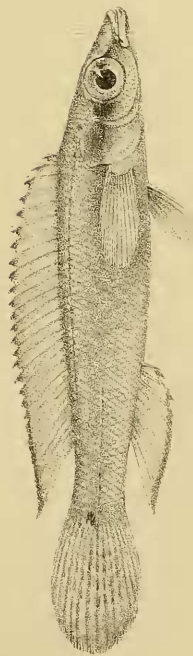
*Acara punctulata* (part.) Günth. Ann. Mag. Nat. Hist. xii. 1863, p. 441.

*Crenicara elegans* Steind. Sitzb. Ak. Wien, lxxi. 1875, p. 99, pl. i. fig. 1.

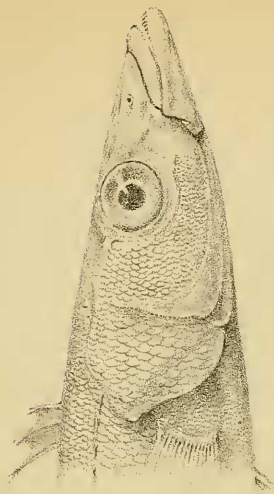
*Crenicara punctulata* Pellegr. Mém. Soc. Zool. France, xvi. 1903, p. 169 (1904).

Depth of body  $2\frac{1}{4}$ – $2\frac{2}{5}$  in the length, length of head  $3\frac{1}{2}$ . Snout a little shorter than eye, the diameter of which is  $2\frac{3}{4}$  in the length of head and equals the interorbital width. Depth of præorbital  $\frac{3}{4}$  the diameter of eye. Maxillary not extending to below the eye; jaws equal anteriorly; cheek with 3 or 4 series of scales, none on the præoperculum; 6 gill-rakers on the lower part of anterior arch. Scales  $29\frac{3}{9}$ , 1 between lateral line and

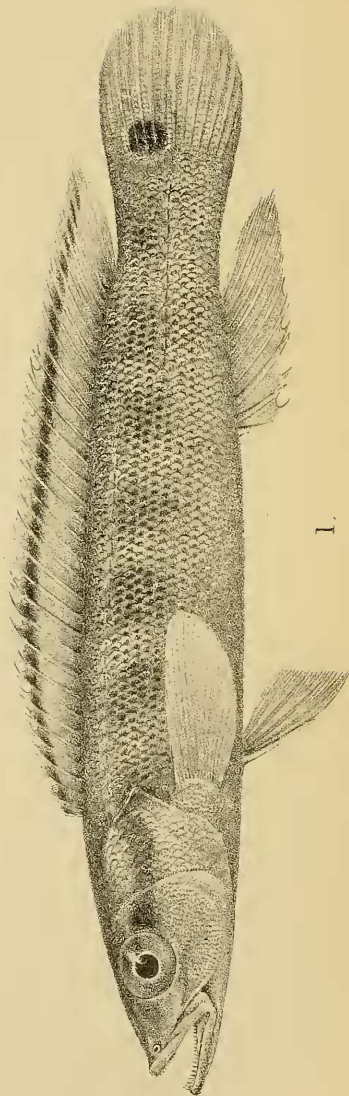
\* For explanation of the Plates, see p. 168.



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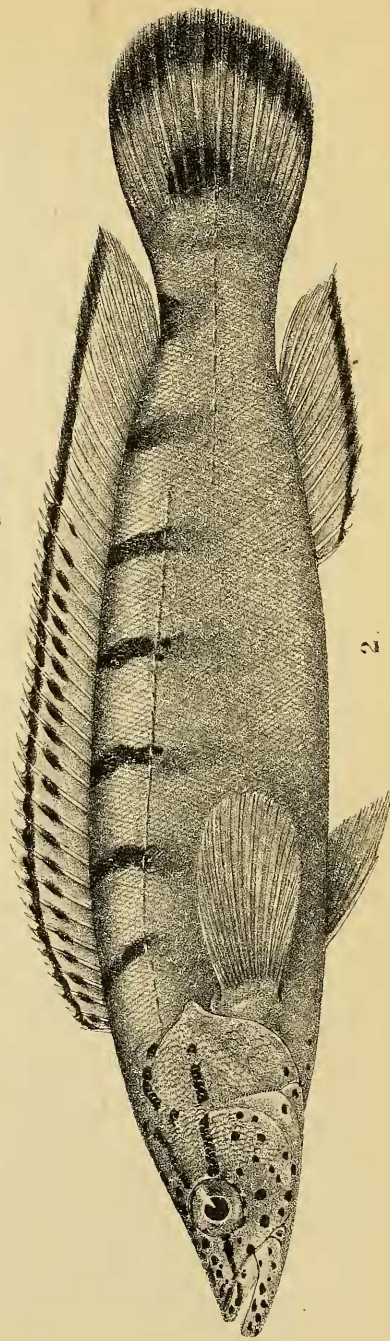
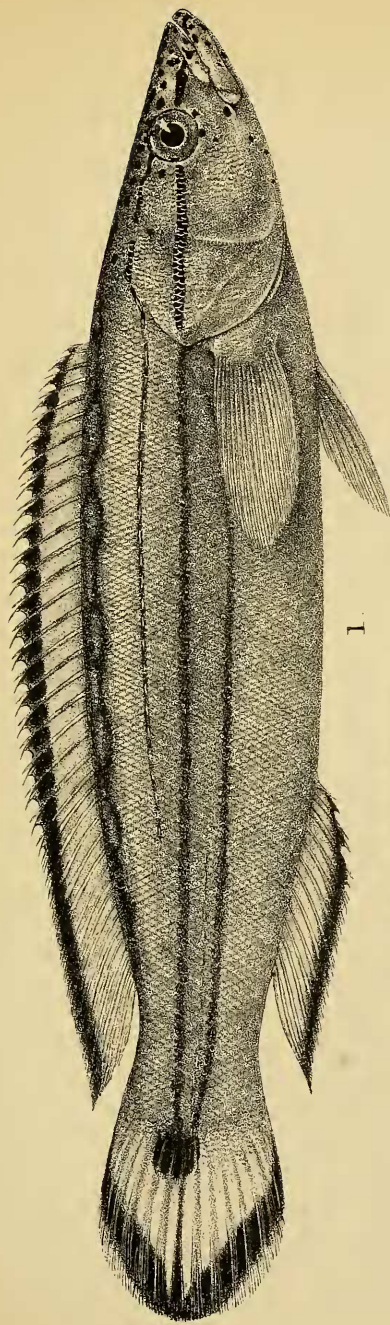


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1





J. Green. del. et lith.

1. *CRENICICHLA STRIGATA*. 2. *C. ORNATA*.

Bale & Danielsson Lith.





anterior rays of soft dorsal. Dorsal XVI (XVII 8) 9, commencing above the opercular cleft, the spines not or only slightly increasing after the fifth, the last  $\frac{1}{2}$ – $\frac{3}{5}$  the length of head; soft fin extending to anterior  $\frac{1}{4}$  of caudal. Anal III (7) 8. Soft dorsal and anal scaleless. Pectoral longer than the head; ventral extending about to origin of anal. Caudal rounded. Caudal peduncle as long as deep. Brownish, with a series of darker blotches on and above the lateral line and another more distinct series below the lateral line; a dark stripe with white edges from eye to mouth; posterior part of spinous dorsal, soft dorsal, and middle part of caudal with alternate light and dark stripes or series of spots; anal with a blackish edge.

R. Amazon; Guiana.

1. (104 mm.) type of the species.

R. Essequibo.

Mr. Ehrhardt.

## 2. CRENACARA MACULATA.

*Dicrossus maculatus* Steind. Sitzb. Ak. Wien, lxxi. 1875, p. 102; Pellegr. Mém. Soc. Zool. France, xvi. 1903, p. 170 (1904).

Depth of body  $3\frac{1}{3}$ –4 in the length, length of head a little more than 3. Snout shorter than eye, the diameter of which is  $2\frac{2}{3}$  in the length of head and a little greater than the interorbital width. Depth of præorbital  $\frac{1}{2}$  the diameter of eye. Maxillary extending to below the eye; jaws equal anteriorly; cheek with 3 series of scales, none on the præoperculum. Scales  $26\frac{2\frac{1}{2}}{8}$ , 1 between lateral line and anterior rays of soft dorsal. Dorsal XIV 9, the spines only slightly increasing after the fifth, the last more than  $\frac{1}{2}$  the length of head; soft fin extending to or beyond base of caudal. Anal III 7. Pectoral as long as the head; ventral extending beyond origin of anal, sometimes to its posterior end. Caudal rounded. Caudal peduncle longer than deep. Colour as in *C. punctulata*, the body with 2 series of dark blotches, a dark stripe from eye to mouth, the vertical fins with alternate light and dark spots.

R. Amazon.

The types described by Steindachner measure up to 60 mm. in total length.

## BATRACHOPS.

*Batrachops* Heck. Ann. Mus. Wien, ii. 1840, p. 432.

*Crenicichla* (part.) Günth. Cat. Fish. iv. p. 305 (1862); Eigenm. & Bray, Ann. Ac. N. York, vii. 1894, p. 620; Pellegr. Mém. Soc. Zool. France, xvi. 1903, p. 372 (1904).

*Boggiania* Perugia, Ann. Mus. Genova, (2) xviii. 1897, p. 148; Pellegr. t. c. p. 371.

Body elongate, little compressed; scales moderate, ctenoid. Two lateral lines; scales of the lateral line larger than the rest. Mouth moderate or large; lower jaw projecting; maxillary exposed distally; teeth conical, in 2 or 3 series in each jaw, the outermost series enlarged, especially in the lower jaw; none of

the teeth depressible. Upper surface of head usually scaly about to the level of the orbits; cheeks and opercular bones scaly; posterior border of præoperculum finely denticulated. Gill-rakers short, few. A single dorsal fin, with XXII-XXIV 10-13 rays. Anal with III 7-10 rays. Pectoral symmetrical, rounded, with about 17 rays; ventrals behind the bases of the pectorals. Caudal rounded.

Five species from South America.

### *Synopsis of the Species.*

#### I. 55-60 scales in a longitudinal series below the lateral line.

Maxillary extending beyond middle of eye .....	1. <i>ocellatus</i> .
Maxillary extending to below anterior margin of eye .....	2. <i>semifasciatus</i> .

#### II. 66-70 scales in a longitudinal series below the lateral line.

##### A. Maxillary extending a little beyond anterior margin of eye.

Diameter of eye 4-5 in the length of head, interorbital width $2\frac{1}{2}$ -3 (in specimens of from 85 to 250 mm. in total length)* .....	3. <i>reticulatus</i> .
Diameter of eye $4\frac{1}{2}$ in the length of head, interorbital width $3\frac{1}{2}$ (in a specimen of 140 mm. in total length) .....	4. <i>punctulatus</i> .

##### B. Maxillary extending to below anterior $\frac{1}{3}$ of eye; diameter of eye $3\frac{1}{2}$ in the length of head and nearly equal to the interorbital width (in a specimen of 150 mm. in total length) .....

5. *cyanonotus*.

#### 1. BATRACHOPS OCELLATUS.

*Boggiania ocellata* Perugia, Ann. Mus. Genova, (2) xviii. 1897, p. 148; Pellegr. Mém. Soc. Zool. France, xvi. 1903, p. 371 (1904).

Depth of body 4 in the length, length of head  $3\frac{1}{4}$ . Diameter of eye  $5\frac{1}{2}$  in the length of head, length of snout 4, interorbital width  $2\frac{1}{5}$ . Nostril equidistant from eye and tip of snout. Maxillary extending nearly to below posterior margin of eye; depth of præorbital  $\frac{1}{2}$  the diameter of eye. Anterior teeth forming 3 series in each jaw. 7 or 8 gill-rakers on the lower part of anterior arch. Scales feebly denticulated except on the head, the lower parts of thorax and abdomen and anteriorly above the lateral line,  $74\frac{8}{13}$ , 60 in a longitudinal series below the lateral line, 4 between last dorsal spine and lateral line, 2 between upper and lower lateral lines. Dorsal XXII 11, the spines subequal from about the eighth, the last nearly  $\frac{1}{3}$  the length of head. Anal III 8. Pectoral  $\frac{2}{3}$ , ventral nearly  $\frac{3}{5}$  the length of head. Caudal peduncle  $\frac{3}{4}$  as long as deep. Olivaceous, with indistinct darker longitudinal stripes along the series of scales; a blackish ocellus on the upper part of the base of caudal.

Upper Paraguay.

Through the kindness of Dr. R. Gestro, of the Genoa Museum, I have been able to examine the type of this species, which measures 265 millimetres in total length. The posterior margin of the præoperculum is denticulated and the gill-membranes are free from the isthmus, as in other species of this genus.

2. *BATRACHOPS SEMIFASCIATUS.*

*Batrachops semifasciatus* Heck. Ann. Mus. Wien, ii. 1840, p. 436.

*Crenicichla semifasciata* Günth. Cat. Fish. iv. p. 309 (1862);  
Pellegr. Mém. Soc. Zool. France, xvi. 1903, p. 375 (1904).

Depth of body 4-5 in the length, length of head  $3-3\frac{1}{2}$ . Diameter of eye  $4\frac{3}{4}-5\frac{1}{2}$  in the length of head. Nostril nearer to tip of snout than to eye. Maxillary extending to below anterior margin of eye; depth of præorbital  $\frac{1}{3}$  the diameter of eye. Anterior teeth forming about 3 series in each jaw. Scales denticulated except on the head, the lower parts of thorax and abdomen and anteriorly above the lateral line, 55-57 in a longitudinal series below the lateral line,  $\frac{10}{22}$  in a transverse series. Lateral line 24-26 + 12-15. Dorsal XXII-XXIII 10-12. Anal III 7-10. Pectoral  $\frac{3}{5}$  the length of head. Caudal peduncle about as long as deep. Scales of the sides of the body yellowish with dark brown margins; a dark stripe from eye to operculum; sometimes 7 or 8 dark cross-bars on the upper part of the body; a dark ocellus on the upper part of the base of caudal; fins unspotted.

Rio de la Plata and its tributaries.

The type, from the R. Paraguay, measures 150 mm. in total length.

3. *BATRACHOPS RETICULATUS.*

*Batrachops reticulatus* Heck. Ann. Mus. Wien, ii. 1840, p. 433.

*Crenicichla reticulata* Günth. Cat. Fish. iv. p. 309 (1862).

*Crenicichla elegans* Steind. Denkschr. Ak. Wien, xlv. 1882, p. 15; Pellegr. Mém. Soc. Zool. France, xvi. 1903, p. 378 (1904).

Depth of body about 5 in the length, length of head about  $3\frac{1}{3}$ . Diameter of eye 4-5 in the length of head, length of snout  $3\frac{1}{2}-4$ , interorbital width  $2\frac{1}{2}-3$ . Nostril nearer to tip of snout than to eye. Maxillary extending a little beyond anterior margin of eye; depth of præorbital  $\frac{3}{4}$  the diameter of eye or less. Anterior teeth forming about 3 series in each jaw. Scales denticulated except on the head, the lower parts of thorax and abdomen and anteriorly above the lateral line, 66-70 in a longitudinal series below the lateral line,  $\frac{9}{22}$  in a transverse series between origin of dorsal and ventral fin. Lateral line 23-26 + 11-13. Dorsal XXII-XXIV 11-12, the spines subequal from the tenth, the last  $\frac{1}{3}$  the length of head or less. Anal III 8. Pectoral  $\frac{3}{5}-\frac{2}{3}$ ; ventral  $\frac{1}{2}-\frac{3}{5}$  the length of head. Brownish, each scale on the side of the body with a dark brown spot at the base and a yellow margin; a dark stripe from eye to extremity of operculum; a dark ocellus on the upper part of the base of caudal; spinous dorsal with 3 longitudinal series of dark spots, which increase in number to 6 on the soft fin; anal with or without a few spots posteriorly; caudal sometimes with dark marginal bands above and below.

The type of the species, from the Rio Negro, measures about



250 mm. in total length. The types of *C. elegans*, from the Peruvian Amazon, 85 and 105 mm. respectively.

4. *BATRACHOPS PUNCTULATUS*, sp. n. (Plate XIV. fig. 1.)

*Crenicichla reticulata* (non Heck.) Pellegr. Mém. Soc. Zool. France, xvi. 1903, p. 378 (1904).

Depth of body  $5\frac{3}{5}$  in the length, length of head  $3\frac{1}{3}$ . Diameter of eye  $4\frac{1}{4}$  in the length of head, length of snout  $3\frac{1}{3}$ , interorbital width  $3\frac{1}{2}$ . Nostril nearer to tip of snout than to eye. Maxillary extending a little beyond anterior margin of eye; depth of preorbital  $\frac{1}{2}$  the diameter of eye. Anterior teeth forming 3 series in each jaw. 9 gill-rakers on the lower part of anterior arch. Scales denticulated except on the head, the lower parts of thorax and abdomen and anteriorly above the lateral line,  $80\frac{11}{24}$ , 68 in a longitudinal series below the lateral line, 4 or 5 between last dorsal spine and lateral line, 3 between upper and lower lateral lines. Dorsal XXIII (XXIV 11–12) 13, the spines subequal from the tenth, the last nearly  $\frac{2}{3}$  the length of head. Anal III (7) 8. Pectoral nearly  $\frac{2}{3}$ , ventral more than  $\frac{1}{2}$  the length of head. Caudal peduncle as long as deep. Brownish, each scale with a dark spot at the base; a dark band from eye to operculum, ending in a spot above the pectoral; traces of cross-bars on the body; a blackish ocellated spot on the upper part of the base of caudal; dorsal with a blackish intramarginal band.

Guiana, R. Amazon.

1. (140 mm.) type of the species.

R. Essequibo.

Mr. Ehrhardt.

5. *BATRACHOPS CYANONOTUS*.

*Crenicichla cyanonotus* Cope, Proc. Am. Phil. Soc. xi. 1871, p. 569; Pellegr. Mém. Soc. Zool. France, xvi. 1903, p. 378 (1904).

Depth of body about  $5\frac{1}{2}$  in the length, length of head about  $3\frac{1}{2}$  ( $6\frac{1}{4}$  and 4 respectively in the total length, with caudal). Snout as long as the eye, the diameter of which is  $3\frac{3}{4}$  in the length of head and nearly equal to the interorbital width. Maxillary extending to below anterior  $\frac{1}{3}$  of eye. 66 scales in a longitudinal series below the lateral line, 5 in a transverse series above the lateral line (? at about the middle of the spinous dorsal), 13 between lateral line and the ventral fin. Dorsal XXIV 11. Anal III 8. Olivaceous; 7 oblique dark cross-bars on the body; a dark stripe from eye to extremity of operculum; a dark ocellus on the upper part of the base of caudal; dorsal and anal fins unspotted, blue at the base.

The type, from the R. Marañon, Upper Amazon, measures 150 mm. in total length.

CRENICICHLA.

*Crenicichla* Heck. Ann. Mus. Wien, ii. 1840, p. 416.

*Crenicichla* (part.) Günth. Cat. Fish. iv. p. 305 (1862); Eigenm. & Bray, Ann. Ac. N. York, vii. 1894, p. 620; Pellegr. Mém. Soc. Zool. France, xvi. 1903, p. 372 (1904).

Body oblong or elongate, more or less compressed; scales small

or moderate, ctenoid or cycloid. Two lateral lines; scales of the lateral lines larger than the rest. Mouth moderate or large; lower jaw projecting; maxillary exposed distally; teeth conical, in several series in each jaw, those of the outermost series usually slightly or moderately enlarged; teeth of the inner series depressible. Upper surface of head scaly about to the level of the orbits; cheeks and opercular bones scaly; posterior border of preoperculum finely denticulated. Gill-rakers short, few (8-12 on the lower part of anterior arch). A single dorsal fin, with XVI-XXV 11-19 rays. Anal with III 7-12 rays. Pectoral symmetrical, rounded, with 15-20 rays; ventrals behind the bases of the pectorals. Caudal rounded.

Sixteen species from South America.

### *Skeleton.*

In *Crenicichla johanna* the skull is depressed and nearly flat above, the supraoccipital and parietal crests being almost obsolete; the former gives rise posteriorly to a rather strong backwardly directed process; a feeble transverse ridge between the orbits forms the posterior border of a broad depression for the reception of the premaxillary processes, which are rather short and do not reach the frontals. The vertebral column consists of 23 præcaudal and 18 caudal vertebrae; parapophyses are developed on the fourth and succeeding præcaudals and are mostly strong and almost horizontal; the first three ribs are sessile, the others inserted on the parapophyses; the epipleurals, except those of the two anterior ribless vertebrae, are attached either to the ribs or to the parapophyses near the insertion of the ribs; none of the anterior vertebrae shows any trace of inferior apophyses. The pelvic bones diverge anteriorly. The lower pharyngeals are united by a straight suture and form a broad triangular piece.

In *Crenicichla saxatilis* the skeleton is essentially similar, but the cranial crests are more distinct and the longer premaxillary processes extend to the transverse ridge on the frontals. There are 20 præcaudal and 15 caudal vertebrae.

### *Synopsis of the Species.*

I. Scales ctenoid, at least on the side of the body below the lateral line; nostril equidistant from tip of snout and eye, or nearer the latter.

A. 38-70 scales in a longitudinal series below the lateral line.

- |   |                       |
|---|-----------------------|
| 1. Maxillary extending beyond anterior margin of eye.   |                       |
| 38-46 scales in a longitudinal series below the lateral line;   |                       |
| depth of body 3-4 in the length. D. XVI-XVIII 13-16.  | 1. <i>lepidota</i> .  |
| 50-62 scales in a longitudinal series below the lateral line;   |                       |
| depth of body $3\frac{3}{4}$ - $4\frac{3}{4}$ in the length. D. XVII-XX 13-16.  | 2. <i>saxatilis</i> . |
| 65-70 scales in a longitudinal series below the lateral line;   |                       |
| depth of body $4\frac{3}{4}$ - $5\frac{1}{2}$ in the length. D. XIX-XXI 13-14.  | 3. <i>lucius</i> .    |
| 54-57 scales in a longitudinal series below the lateral line;   |                       |
| depth of body $5$ - $5\frac{1}{2}$ in the length. D. XX-XXII 11-12.   | 4. <i>geayi</i> .     |
| 2. Maxillary extending to the vertical from anterior margin of eye; 63-70 scales in a longitudinal series below the lateral line. |                       |

- D. XX-XXIII 12-13. A. III 8-10; diameter of eye  $\frac{1}{5}$  the length of head (in a specimen of 169 mm.) ..... 5. *lacustris*.  
 D. XX-XXII 10-11. A. III 7-8; diameter of eye  $\frac{1}{4}$  the length of head (in a specimen of 225 mm.) ..... 6. *macrophthalmus*.  
 3. Maxillary not extending to the vertical from anterior margin of eye; 57 scales in a longitudinal series below the lateral line. D. XVIII-XX 11-13. A. III 7-9 ..... 7. *wallacii*.  
 B. 84-130 scales in a longitudinal series below the lateral line.  
 1. Maxillary not extending to below the eye: snout more than  $\frac{1}{5}$  the length of head.  
   *a*. Interorbital width  $4\frac{1}{2}$ -5 in the length of head.  
 D. XXI 13-14. A. III 9-10. 84-95 scales in a longitudinal series below the lateral line ..... 8. *vittata*.  
 D. XXIV 14. A. III 11. 113 scales in a longitudinal series below the lateral line ..... 9. *acutirostris*.  
   *b*. Interorbital width  $3\frac{1}{5}$  in the length of head.  
 D. XXIV-XXV 13-14. A. III 9-10 ..... 10. *multispinosa*.  
 2.\* Maxillary extending to below anterior margin of eye or a little beyond; snout  $\frac{1}{5}$  the length of head or less.  
   *a*. Scales above posterior part of upper lateral line ctenoid. D. XXII-XXIII 15-17. A. III 10-12. 93-108 scales in a longitudinal series below the lateral line, 14-16 between first dorsal spine and lateral line; snout  $3\frac{1}{2}$ - $3\frac{3}{4}$  in the length of head ..... 11. *strigata*.  
   106-113 scales in a longitudinal series below the lateral line, 16-17 between first dorsal spine and lateral line; snout  $3$ - $3\frac{1}{4}$  in the length of head ..... 12. *lugubris*.  
   120 scales in a longitudinal series below the lateral line, 20 between first dorsal spine and lateral line ..... 13. *cincta*.  
   *b*. Scales above upper lateral line all cycloid; 112-130 in a longitudinal series below the lateral line. D. XXI-XXIII 17-19. A. III 11-12.  
 18-20 scales between first dorsal spine and lateral line; maxillary extending a little beyond anterior margin of eye ..... 14. *ornata*.  
 15 or 16 scales between first dorsal spine and lateral line; maxillary extending to below anterior margin of eye ..... 15. *lenticulata*.  
 II. Scales cycloid, small; nostril nearer to tip of snout than to eye ..... 16. *johanna*.

# 1. CRENICICHLA LEPIDOTA.

*Crenicichla lepidota* Heck. Ann. Mus. Wien, ii. 1840, p. 429; Hens. Arch. f. Nat., 1870, p. 55; Steind. Sitzb. Ak. Wien, lxx. 1874, p. 520; Pellegr. Mém. Soc. Zool. France, xvi. 1903, p. 372 (1904).

Depth of body 3-4 in the length, length of head 3. Diameter of eye  $3\frac{1}{2}$ -5 in the length of head, length of snout  $3\frac{1}{2}$ -4 and equal to the interorbital width. Nostril nearer to eye than to tip of snout. Maxillary extending to below anterior  $\frac{1}{3}$  of eye or beyond; depth of preorbital  $\frac{2}{5}$  the diameter of eye or less. Anterior teeth

\* *Crenicichla brasiliensis* var. *marmorata* (Pellegr. Mém. Soc. Zool. France, xvi. 1903, p. 383, fig.) is probably a valid species belonging to this section, but is insufficiently described. D. XXIV 17. A. III 11. Scales 116 (*i. e.* below the lateral line)  $1\frac{1}{4}$ . Yellowish; an irregular brown band at the base of the dorsal; a series of brown spots and blotches along the middle of the side. The *Perca brasiliensis* of Bloch does not resemble any known species of *Crenicichla* and may represent a young example of *Cichla temensis* Humb.

forming 4 series in the upper jaw, 3 in the lower. 10 or 11 gill-rakers on the lower part of anterior arch. Scales denticulated except on the head and the lower parts of the thorax and abdomen, 48-60  $\frac{5-7}{11-14}$ , 38-46 in a longitudinal series below the lateral line, 2-3 $\frac{1}{2}$  between last dorsal spine and lateral line, 2 between upper and lower lateral lines. Lateral line 21-24+7-10. Dorsal (XVI) XVII-XVIII 13-14 (15-16), the spines subequal or only slightly increasing from the sixth, the last  $\frac{1}{3}$ - $\frac{2}{5}$  the length of head. Anal III 8-10. Pectoral  $\frac{3}{2}$ - $\frac{3}{4}$ , ventral  $\frac{1}{2}$ - $\frac{2}{3}$  the length of head. Caudal peduncle deeper than long. Brownish; a dark stripe from snout through eye to extremity of operculum, continued on the body as a longitudinal band in the young; a dark oblique stripe below the eye; a dark blotch above the pectoral; sometimes obscure cross-bars on the upper part of the body; a dark spot or ocellus on the upper half of the base of caudal; vertical fins greyish, the dorsal sometimes with a blackish edge, the soft dorsal and caudal sometimes with clear spots.

Southern Brazil; Rio de la Plata.

1. (159 mm.)	Rio Grande do Sul.	Dr. H. von Ihering.
2. (69 mm.)	Upper Paraguay.	Dr. A. Borelli.
3. (75 mm.)	Carandasiñho, Matto Grosso.	Dr. A. Borelli.
4. (162 mm.)	Paraguay.	Dr. Ternetz.

## 2. CRENICICHLA SAXATILIS.

Linn. Mus. Ad. Frid. p. 65, pl. xxxi. fig. 1 (1754).

Gronov. Mus. Ichth. ii. No. 185, p. 29, pl. vi. fig. 3 (1756).

*Sparus saxatilis* Linn. Syst. Nat. (ed. 10), p. 278 (1758).

*Scarus rufescens* Gronov. Zoophyl. p. 67, pl. vi. fig. 3 (1763).

*Perca saxatilis* Bloch, Ausl. Fische, vi. p. 79, pl. 309 (1792).

*Cichla labrina* Agass. in Spix, Pisc. Bras. p. 99, pl. lxii. fig. 1 (1829); Schomb. Fish. Guiana, p. 139, pl. iii. (1843).

*Crenicichla saxatilis* Heck. Ann. Mus. Wien, ii. 1840, p. 432; Günth. Cat. Fish. iv. p. 308 (1862); Eigenm. & Bray, Ann. Ac. N. York, vii. 1894, p. 620; Pellegr. Mém. Soc. Zool. France, xvi. 1903, p. 373 (1904).

*Cychla rutilans* Schomb. t. c. p. 142, pl. v.

*Scarus pavoninus* Gronov. Cat. Fish. p. 67 (1854).

*Crenicichla frenata* Gill, Ann. Lyc. N. York, vi. 1858, p. 386.

*Crenicichla proteus* Cope, Proc. Ac. Philad. xxiii. 1872, p. 252;

Pellegr. l. c.

*Crenicichla proteus*, var. *argymnis* Cope, l. c.

*Crenicichla saxatilis*, var. *semicincta* Steind. Denkschr. Ak.

Wien, lix. 1892, p. 376; Pellegr. t. c. p. 374.

*Crenicichla argymnis* Pellegr. t. c. p. 373.

*Crenicichla saxatilis*, var. *albopunctata* Pellegr. t. c. p. 374.

*Crenicichla vaillanti* Pellegr. Bull. Mus. Paris, 1903, p. 124, and t. c. p. 376.

Depth of body  $3\frac{2}{5}$ - $4\frac{2}{5}$  in the length, length of head  $3$ - $3\frac{2}{5}$ .

Diameter of eye  $3\frac{3}{4}$ – $5\frac{1}{3}$  in the length of head, length of snout  $3$ – $3\frac{3}{4}$ , interorbital width  $3$ – $4$ . Nostril nearer to eye than to tip of snout. Maxillary extending to below anterior  $\frac{1}{3}$  of eye; depth of preorbital  $\frac{1}{3}$ – $\frac{1}{2}$  the diameter of eye. Anterior teeth forming  $4$  or  $5$  series in the upper jaw,  $3$  or  $4$  in the lower.  $9$ – $11$  gill-rakers on the lower part of anterior arch. Scales denticulated except on the head and the lower parts of thorax and abdomen,  $60$ – $73$   $\frac{6-8}{15-18}$ ,  $50$ – $62$  in a longitudinal series below the lateral line,  $3$ – $4\frac{1}{2}$  between last dorsal spine and lateral line,  $2$  or  $3$  between upper and lower lateral lines. Lateral line  $22$ – $26$  +  $9$ – $12$ . Dorsal XVII–XX  $13$ – $16$ , the spines subequal from about the eighth, the last  $\frac{1}{3}$ – $\frac{2}{5}$  the length of head. Anal III  $8$ – $10$ . Pectoral about  $\frac{3}{5}$ , ventral  $\frac{1}{2}$ – $\frac{2}{5}$  the length of head. Caudal peduncle  $\frac{3}{4}$  to as long as deep. Olivaceous; a dark stripe from eye to extremity of operculum, sometimes continued forward on the snout, rarely edged with white above and below; often a dark spot or oblique stripe below the eye; body with or without white spots, which may be numerous and well-developed; sometimes a continuous dark longitudinal band from operculum to caudal, which may be represented by a series of blotches or by a single blotch, or sometimes an ocellated spot, above the pectoral; a dark spot, often ocellated, on the upper part of the base of caudal; dorsal and anal sometimes with a narrow dark edge; spinous dorsal sometimes with an intramarginal series of blackish spots, one on each interradiial membrane; soft dorsal and caudal often with alternate series of light and dark spots.

R. Amazon; Guiana; Trinidad; Rio Grande do Sul.

1. (133 mm.)	Brit. Guiana.	Sir R. Schomburgk.
2–4. (99–145 mm.)	Demerara.	Dr. Hancock.
5, 6. (89 and 103 mm.)	Brit. Guiana.	
7. (200 mm.)		
8, 9. (171 and 226 mm.)	Guiana.	
10, 11. (73 and 108 mm.)	R. Cupai.	
12. (217 mm.)	R. Essequibo.	Mr. Ehrhardt.
13–15. (170–271 mm.)		College of Surgeons.
16–18. (150–201 mm.)		Stuttgart Mus.
19. (141 mm.)	Surinam.	
20–22. (165–211 mm.)	"	Mr. Kappler.
23. (66 mm.)	Brit. Guiana.	C. W. Cottam, Esq.
24, 25. (154 and 205 mm.)	Berbice.	J. G. Beckford, Esq.
26. (104 mm.)	Tabatinga.	Mus. Comp. Zool.
27. (155 mm.)	Rio Grande do Sul.	Dr. H. von Ihering.
28. (185 mm.)	Trinidad.	F. W. Ulrich, Esq.
29–35. (153–251 mm.)	"	L. Guppy, Esq.

### 3. CRENICICHLA LUCIUS.

*Crenicichla lucius* Cope, Proc. Am. Phil. Soc. xi. 1871, p. 570; Pellegr. Mém. Soc. Zool. France, xvi. 1903, p. 377 (1904).

*Crenicichla anthurus* Cope, Proc. Ac. Philad. xxiii. 1872, p. 252, pl. x. fig. 1; Pellegr. l. c.

Depth of body  $4\frac{2}{3}$ – $5\frac{1}{2}$  in the length, length of head  $3$ . Diameter of eye  $4\frac{1}{2}$ – $6$  in the length of head, length of snout  $3\frac{1}{3}$ – $3\frac{2}{3}$ , interorbital width  $4$ – $5\frac{1}{3}$ . Nostril nearer to eye than to tip of snout. Maxillary extending to below anterior  $\frac{1}{3}$  of eye; depth of



præorbital  $\frac{2}{5}$ – $\frac{1}{2}$  the diameter of eye. Anterior teeth forming 4 or 5 series in the upper jaw, 3 or 4 in the lower. 10 or 11 gill-rakers on the lower part of anterior arch. Scales denticulated except on the head, the lower parts of thorax and abdomen, and anteriorly above the lateral line, 75–80  $\frac{9-11}{20-24}$ , 65–70 in a longitudinal series below the lateral line,  $4\frac{1}{2}$ –6 between last dorsal spine and lateral line, 3 between upper and lower lateral lines. Lateral line 23–24+12–13. Dorsal XIX–XXI 13–14, the spines only slightly increasing after the fifth or sixth, the last  $\frac{1}{3}$  the length of head. Anal III 10. Pectoral  $\frac{2}{5}$ – $\frac{2}{3}$ , ventral  $\frac{1}{2}$ – $\frac{2}{5}$  the length of head. Caudal peduncle  $1\frac{1}{5}$ – $1\frac{2}{5}$  as long as deep. Olivaceous, sometimes with white spots on the body; a dark stripe from snout through eye to extremity of operculum; a dark ocellus on the lateral line above the pectoral, another on the upper part of the base of caudal; soft dorsal and caudal greyish, with light spots.

Amazons of Ecuador.

- 1, 2. (123 and 150 mm.)  
3. (198 mm.)

Canelos.  
R. Zamora.

C. Buckley, Esq.  
Dr. H. Festa.

#### 4. *CRENICICHLA GEAYI*.

*Crenicichla geayi* Pellegr. Bull. Mus. Paris, 1903, p. 123, and Mém. Soc. Zool. France, xvi. 1903, p. 375, pl. vi. fig. 4 (1904).

Depth of body  $5$ – $5\frac{1}{2}$  in the length, length of head  $3\frac{1}{3}$ . Diameter of eye 5 in the length of head, length of snout  $3\frac{1}{3}$ , interorbital width 4. Nostril nearer to eye than to tip of snout. Maxillary extending to below middle of eye; depth of præorbital  $\frac{2}{5}$  the diameter of eye. Anterior teeth forming 4 series in the upper jaw, 3 in the lower. 9 or 10 gill-rakers on the lower part of anterior arch. Scales denticulated, except on the head, the lower parts of thorax and abdomen and anteriorly above the lateral line,  $65\frac{8}{19}$  ( $\frac{10}{25}$ ), 54 (57) in a longitudinal series below the lateral line, 4 between last dorsal spine and lateral line, 2 between upper and lower lateral lines. Lateral line 24–25+10–11. Dorsal XX 12 (XXII 11), the spines only slightly increasing from the tenth, the last  $\frac{1}{3}$  the length of head. Anal III (8) 9. Pectoral  $\frac{2}{5}$ – $\frac{2}{3}$ , ventral  $\frac{1}{2}$  the length of head. Caudal peduncle longer than deep. Brownish; a dark stripe from eye to extremity of operculum; sometimes a series of blotches along the middle of the side; a dark spot or ocellus on the upper part of the base of caudal.

R. Orinoco.

1. (159 mm.)

Near Bogota.

Mr. Cutter.

This specimen agrees so well with the figure of the typical example of *C. geayi* given by Pellegrin that I have no hesitation in referring it to that species. The number of fin-rays (D. XX 12 instead of XXII 11, A. III 9 instead of III 8) and of scales in a transverse series ( $\frac{8}{19}$  instead of  $\frac{10}{25}$ ), although different, fall within the limits of individual variation, whilst the presence or absence of a series of blotches on the side is of very slight importance

5. *CRENICICHLA LACUSTRIS*.

*Cychna lacustris* Casteln. Anim. Am. Sud, Poiss. p. 19, pl. viii. fig. 3 (1855).

*Crenicichla lacustris* Günth. Cat. Fish. iv. p. 308 (1862); Steind. Sitzb. Ak. Wien, lxx. 1874, p. 516; Cope, Proc. Am. Phil. Soc. xxxiii. 1894, p. 102; Pellegr. Mém. Soc. Zool. France, xvi. 1903, p. 379 (1904).

*Crenicichla punctata* Hens. Arch. f. Nat. i. 1870, p. 57.

*Crenicichla polysticta* Hens. t. c. p. 58.

Depth of body  $4\frac{2}{3}$ -5 in the length, length of head  $3-3\frac{1}{4}$ . Diameter of eye 4-5 in the length of head, length of snout  $3-3\frac{1}{2}$ , interorbital width  $4\frac{2}{3}-5\frac{1}{3}$ . Nostril nearer to eye than to extremity of snout. Maxillary extending to below anterior margin of eye; depth of preorbital  $\frac{1}{2}-\frac{2}{7}$  the diameter of eye. Anterior teeth forming 5 series in the upper jaw, 4 in the lower. 10 gill-rakers on the lower part of anterior arch. Scales denticulated, except on the head, the lower parts of thorax and abdomen and anteriorly above the lateral line, 80-90  $\frac{11-1}{23-26}$ , 63-70 in a longitudinal series below the lateral line, 5 or 6 between last dorsal spine and lateral line, 3 or 4 between upper and lower lateral lines. Lateral line 23-26+13-14. Dorsal XXII 12 (XX-XXIII 12-13), the spines subequal from the ninth or tenth, the last  $\frac{1}{3}$  the length of head. Anal III 8-9 (10). Pectoral nearly  $\frac{2}{3}$  the length of head, ventral nearly  $\frac{3}{5}$ . Caudal peduncle  $1\frac{1}{4}-1\frac{1}{3}$  as long as deep. Olivaceous, with numerous small dark violet spots on upper part of head and body and on the vertical fins; sometimes a dark stripe from snout through eye to extremity of operculum, continued as a series of blotches along the middle of the side; a dark spot, sometimes ocellated, on the upper part of the base of caudal.

Southern and Eastern Brazil.

- |              |                                      |                      |
|--------------|--------------------------------------|----------------------|
| 1. (169 mm.) | Porto Real, Prov. Rio Janeiro.       | M. Hardy du Dréneuf. |
| 2. (88 mm.)  | Laguna dos Patos, Rio Grande do Sul. | Dr. H. von Ihering.  |

6. *CRENICICHLA MACROPHthalmus*.

*Crenicichla macrophthalmus* Heck. Ann. Mus. Wien, ii. 1840, p. 427; Günth. Cat. Fish. iv. p. 307 (1862); Pellegr. Mém. Soc. Zool. France, xvi. 1903, p. 379 (1904).

Depth of body about  $4\frac{2}{3}$  in the length, length of head 3. Diameter of eye 4 in the length of head and equal to the interorbital width. Nostril about equidistant from eye and tip of snout. Maxillary extending to below anterior margin of eye; depth of preorbital  $\frac{2}{5}$  the diameter of eye. Scales denticulated, except on the head, the lower parts of thorax and abdomen and anteriorly above the lateral line, 66-70 in a longitudinal series below the lateral line,  $\frac{8-9}{17-19}$  in a transverse series. Lateral line 23-25+12-13. Dorsal XX-XXII 10-11. Anal III 7-8. Pectoral  $\frac{3}{5}$ , ventral  $\frac{1}{2}$  the length of head. Caudal peduncle a little longer than deep. Brownish; a dark stripe from eye to operculum; scales of the

lateral line white with a blackish edge; vertical fins grey, unspotted, with dark edges.

Rio Negro.

The type measures 225 mm. in total length.

7. *CRENICICHLA WALLACII*, sp. n. (Plate XIV. fig. 2.)

Depth of body  $5\frac{1}{4}$  in the length, length of head  $3\frac{1}{3}$ . Snout as long as eye, the diameter of which is  $3\frac{1}{2}$  in the length of head, interorbital width  $4\frac{1}{3}$ . Nostril a little nearer to eye than to tip of snout. Maxillary not extending to below the eye; depth of præorbital  $\frac{1}{2}$  the diameter of eye. Anterior teeth forming 5 or 6 series in each jaw. 9 gill-rakers on the lower part of anterior arch. Scales denticulated, except on the head, the lower parts of thorax and abdomen and anteriorly above the lateral line,  $64\frac{6}{18}$ , 57 in a longitudinal series below the lateral line, 2 between last dorsal spine and lateral line, 3 between upper and lower lateral lines. Lateral line  $21+10$ . Dorsal XX 11 (XVIII 13), the spines subequal from the ninth, the last  $\frac{1}{2}$  the length of head. Anal III 7 (9). Pectoral  $\frac{5}{7}$ , ventral  $\frac{3}{5}$  the length of head. Caudal peduncle longer than deep. Brownish; a dark stripe from snout through eye to extremity of operculum, continued faintly along the side; dorsal and anal with a blackish marginal stripe; caudal with obscure cross-bars and with a dark spot on the upper part of its base.

R. Essequibo; R. Negro.

1. (85 mm.) type of the species.

R. Essequibo.

Mr. Ehrhardt.

Dr. A. R. Wallace has made a drawing of a fish of about the same size as the one described above and evidently of the same species, which he obtained in the Rio Negro in 1851. It was a great misfortune that the magnificent collection of Fishes of the Rio Negro made by the celebrated naturalist should have been accidentally destroyed and thus lost to science. Dr. Wallace gives the number of fin-rays as D. XVIII 13. A. III 9.

8. *CRENICICHLA VITTATA*.

*Crenicichla vittata* Heck. Ann. Mus. Wien, ii. 1840, p. 417.

Depth of body  $4\frac{2}{3}$ –5 in the length, length of head  $3\frac{1}{3}$ – $3\frac{1}{2}$ . Diameter of eye 5 in the length of head, length of snout  $2\frac{3}{5}$ , interorbital width  $4\frac{1}{2}$ –5. Nostril nearer to eye than to tip of snout. Maxillary not extending to below the eye; depth of præorbital  $\frac{3}{4}$  the diameter of eye. Anterior teeth forming 7 or 8 series in the upper jaw, 5 or 6 in the lower. 9 or 10 gill-rakers on the lower part of anterior arch. Scales denticulated, except on the head and the lower part of thorax and abdomen,  $110-120\frac{11-13}{24-28}$ , 84–95 in a longitudinal series below the lateral line, 6 between last dorsal spine and lateral line, 4 between upper and lower lateral lines. Lateral line  $27+12-14$ . Dorsal XXIII 13–14, the spines subequal from the sixth, the last nearly  $\frac{1}{3}$  the length of head. Anal III 9 (10). Pectoral  $\frac{2}{5}$ , ventral more than half the length of head.

Caudal peduncle  $1\frac{1}{4}$  as long as deep. Brownish; a dark longitudinal band from tip of snout through eye to extremity of caudal; upper part of body with traces of dark cross-bars; a dark oblique stripe below the eye; a dark ocellated spot on the base of the caudal, just above the lateral line; dorsal with longitudinal series of greyish spots; caudal with a dark lower margin.

R. Amazon; R. Paraguay; Eastern Brazil.

1. (146 mm.)
2. (167 mm.)

R. Parana.  
Descalvados, Matto Grosso.

Mr. Salmin.  
Dr. Ternetz.

#### 9. *CRENICICHLA ACUTIROSTRIS*. (Plate XIV. fig. 3.)

*Crenicichla acutirostris* Günth. Cat. Fish. iv. p. 307 (1862); Pellegr. Mém. Soc. Zool. France, xvi. 1903, p. 384 (1904).

Depth of body nearly 6 in the length, length of head  $3\frac{1}{2}$ . Diameter of eye  $5\frac{1}{2}$  in the length of head, length of snout  $2\frac{3}{4}$ , interorbital width  $4\frac{1}{2}$ . Nostril a little nearer to eye than to tip of snout. Maxillary not extending to below the eye; depth of præorbital nearly  $\frac{3}{2}$  the diameter of eye. Anterior teeth forming 7 series in the upper jaw, 4 in the lower. 9 gill-rakers on the lower part of anterior arch. Scales denticulated, except on the head, the lower parts of thorax and abdomen and anteriorly above the lateral line, 125  $\frac{13}{32}$ , 113 in a longitudinal series below the lateral line, 7 between last dorsal spine and lateral line, 5 between upper and lower lateral lines. Lateral line 26 + 14. Dorsal XXIV 14, the spines subequal from about the tenth, the last  $\frac{3}{8}$  the length of head. Anal III 11. Pectoral as long as ventral, a little more than  $\frac{1}{2}$  the length of head. Caudal peduncle a little longer than deep. Brownish, with 10 dark cross-bars on the upper part of the side; anal with a narrow dark edge.

River Cupai.

1. (217 mm.) type of the species. R. Cupai.

#### 10. *CRENICICHLA MULTISPINOSA*.

*Crenicichla multispinosa* Pellegr. Bull. Mus. Paris, 1903, p. 124, and Mém. Soc. Zool. France, xvi. 1903, p. 380, pl. vi. fig. 3 (1904).

Depth of body  $5\frac{1}{3}$  in the length, length of head  $3\frac{2}{5}$ . Diameter of eye nearly 6 in the length of the head, length of snout  $2\frac{2}{3}$ , interorbital width  $3\frac{1}{5}$ . Nostril nearer to eye than to extremity of snout. Maxillary not extending to below the eye; depth of præorbital  $\frac{4}{5}$  the diameter of eye. Anterior teeth forming 8 series in the upper jaw, 4 in the lower. 10 or 11 gill-rakers on the lower part of anterior arch. Scales denticulated, except on the head, the lower parts of thorax and abdomen and above the upper lateral line, 118  $\frac{16}{42}$ , 102 in a longitudinal series below the lateral line, 9 between last dorsal spine and lateral line, 5 between upper and lower lateral lines. Lateral line 27 + 14. Dorsal (XXIV) XXV 13 (14), the spines subequal from about the eighth, the last  $\frac{1}{3}$  the length of head. Anal III 9 (10). Pectoral  $\frac{3}{5}$ , ventral  $\frac{1}{2}$  the length of the head. Caudal peduncle a little longer than deep. Brownish, with numerous small white spots on the